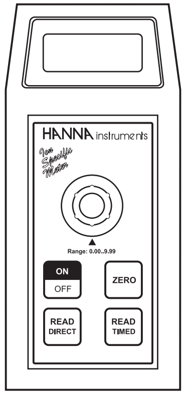
Instruction Manual

HI 93709 Manganese High Range ISM



HANNA instruments®

www.hannainst.com

This Instrument is in Compliance with the CE Directives

Warranty

HI 93709 is warranted for two years against defects in workmanship and materials when used for its intended purpose and maintained according to instructions.

This warranty is limited to repair or replacement free of charge.

Damages due to accident, misuse, tampering or lack of prescribed maintenance are not covered.

If service is required, contact the dealer from whom you purchased the instrument. If under warranty, report the model number, date of purchase, serial number and the nature of the failure. If the repair is not covered by the warranty, you will be notified of the charges incurred. If the instrument is to be returned to Hanna Instruments, first obtain a Returned Goods Authorization Number from the Customer Service department and then send it with shipment costs prepaid. When shipping any instrument, make sure it is properly packaged for complete protection.

To validate your warranty, fill out and return the enclosed warranty card within 14 days from the date of purchase.

Hanna Instruments reserves the right to modify the design, construction and appearance of its products without advance notice.

Dear Customer,

Thank you for choosing a Hanna product. This manual will provide you with the necessary information for the correct operation of the meter. Please read it carefully before using the meter. If you need additional technical information, do not hesitate to e-mail us at tech@hannainst.com.

This instrument is in compliance with CE directives.

Preliminary Examination

Remove the instrument from the packing material and examine it carefully to make sure that no damage has occurred during shipment. If there is any damage, notify your Dealer.

Each Ion Specific Meter is supplied complete with

- 9V Battery
- Two Sample Cuvets and Caps
- One Transport Cap

Note: Conserve all packing material until the instrument has been observed to function correctly. Any defective item must be returned in its original packing.

General Description

The **HI 93709** meter measures the manganese content in water and wastewater in the 0.0 to 20.0 mg/L (ppm) range.

The meter uses an exclusive positive-locking system to ensure that the cuvet is in the same place every time it is placed into the measurement cell.

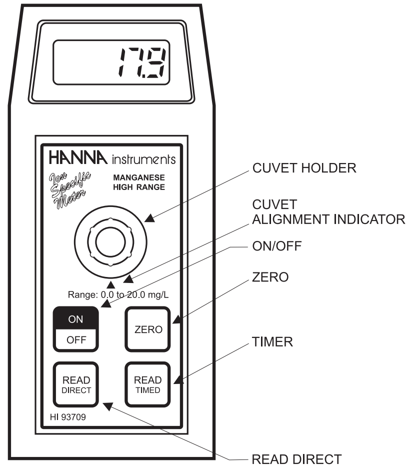
The reagents are in powder form and are supplied in packets. The amount of reagent is precisely dosed to ensure maximum repeatability.

Display codes aid the user in routine operations.

The meters have an auto-shut off feature that will turn the instrument off after 10 minutes of non-use.

IST93709R2 01/07

Specifications



SPECIFICATIONS

Range	0.0 to 20.0 mg/L
Resolution	0.1 mg/L
Accuracy	±0.2 mg/L ±3% of reading
Typical EMC Deviation	±0.1 mg/L
Light Source	Light Emitting Diode @ 555 nm
Method	Adaptation of the Standard Methods for the Examination of Water and Wastewater, 18th edition, Periodate method. The reaction between manganese and reagents causes a violet tint in the sample.
Light Detector	Silicon Photocell
Environment	0 to 50°C (32 to 122°F); max 95% RH non-condensing
Battery Type/Life	1 x 9 volt/40 hours
Auto-Shut off	After 10' of non-use
Dimensions	180 x 83 x 46 mm (7.1 x 3.3 x 1.8")
Weight	290 g (10 oz.).

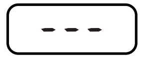
REQUIRED REAGENTS

Code	Description	Quantity
HI 93709**A**-0	Manganese HR Reagent A	1 packet
HI 93709**B**-0	Manganese HR Reagent B	1 packet

REAGENT SETS

HI 93709-01	Reagents for 100 tests
HI 93709-03	Reagents for 300 tests

Display Code Guide



This indicates that the meter is in a ready state and zeroing can be performed.



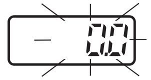
Sampling in Progress. This prompt appears each time the meter is performing a measurement.



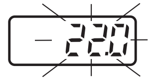
This indicates that the meter is in a zeroed state and measurement can be performed.



A zero reading was not taken. Insert a sample before adding reagent and press ZERO.



Under range. A blinking "0.0" indicates that the sample absorbs less light than the zero reference. Check the procedure and make sure you use the same cuvet for reference (zero) and measurement.



Over range. A flashing value higher than the maximum concentration readable (see specifications) indicates that the sample absorbs too much light, meaning that the concentration is too high. Dilute the sample.



Light over range. The cuvet is not inserted correctly and an excess ambient light is reaching the detector. If the cover is properly installed, then contact your dealer or the nearest Hanna Customer Service Center.



Light under range. The zero sample is too dark for proper zeroing. If this is not the case, contact your dealer or the nearest Hanna Customer Service Center.



The "V" indicates that the battery voltage is getting low and the battery needs to be replaced.



This indicates that the battery is dead and must be replaced.

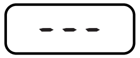
Note: once this indication is displayed, the meter will lockup. Change the battery to restart.

Operational Guide

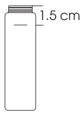
MEASUREMENT PROCEDURE



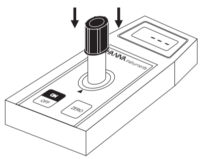
- Turn the meter on by pressing ON/OFF.



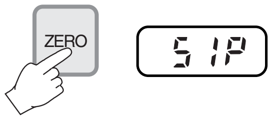
- When the LCD displays "- - -", it is ready.



- Fill the cuvet up to 1.5 cm (¾") below the rim with 10 mL of unreacted sample, and replace the cap.

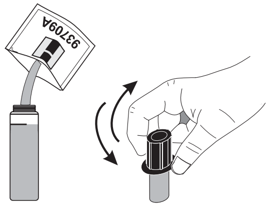


- Place the cuvet into the holder and ensure that the notch on the cap is positioned securely into the groove.
- Press ZERO and "SIP" will appear on the display.

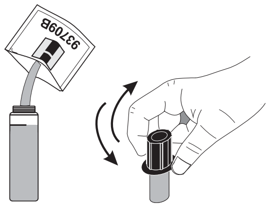




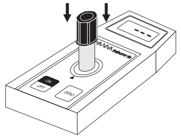
- Wait for a few seconds and the display will show "-0.0-". Now the meter is zeroed and ready for measurement.
- Remove the cuvet.
- Add the content of one packet of HI 93709A-0 Manganese HR Reagent A. Replace the cap and shake gently.



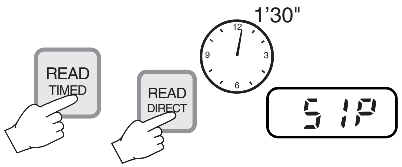
- Add the content of one packet of HI 93709B-0 Manganese HR Reagent B. Replace the cap and shake gently.



- Reinsert the cuvet into the instrument.



- Press READ TIMED and the display will show the countdown prior to the measurement, or, alternatively wait for 1 minute and 30 seconds and press READ DIRECT. In both cases "SIP" will appear during measurement.



- The instrument directly displays concentration in mg/L of manganese on the Liquid Crystal Display.

INTERFERENCES

Interference may be caused by:
Calcium above 700 mg/L
Chloride above 70000 mg/L
Iron above 5 mg/L
Magnesium above 100000 mg/L.

Tips for an Accurate Measurement

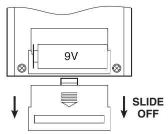
The instruction listed below should be carefully followed during testing to ensure best accuracy.

- Do not touch the cuvet walls with hands.
- In order to maintain the same conditions during the zeroing and the measuring phases, it is necessary to close the cuvet to prevent any contamination.
- Do not let the test sample stand too long after reagent is added or accuracy will be lost.
- Whenever the cuvet is placed into the measurement cell, it must be completely free of fingerprints, oil or dirt. Wipe it thoroughly with **HI 731318** or a lint-free cloth prior to insertion.
- It is important that the sample does not contain any debris. This would corrupt the readings.
- It is possible to take multiple readings in a row, but it is recommended that a zero reading be taken for each sample and that the same cuvet is used for zeroing and measurement.
- It is important to discard the sample immediately after the reading is taken because the glass might become permanently stained.
- Shaking the cuvet can generate bubbles in the sample, causing higher readings. To obtain accurate measurements, remove such bubbles by swirling or by gently tapping the vial.
- All the reaction times reported in this manual are referred to 20°C (68°F). As a general rule of thumb, they should be doubled at 10°C (50°F) and halved at 30°C (86°F).

Battery Replacement

Battery replacement must only take place in a non-hazardous area using a 9V alkaline battery.

Simply slide off the battery cover on the back of the meter. Detach the battery from the terminals and attach a fresh 9V battery while paying attention to the correct polarity. Replace the battery and the cover.



Accessories

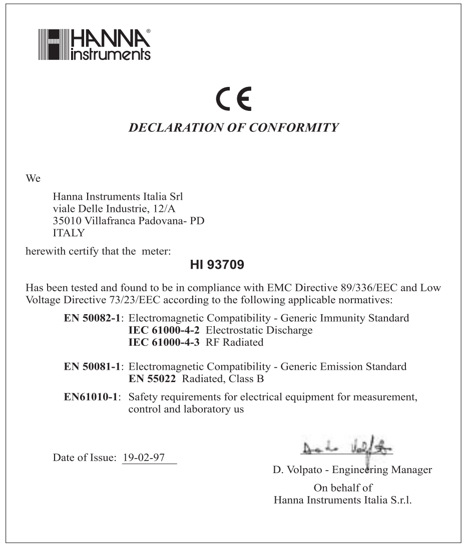
REAGENT SETS

HI 93709-01 Reagents for 100 tests
HI 93709-03 Reagents for 300 tests

OTHER ACCESSORIES

HI 710009	Blue rubber boot
HI 710010	Orange rubber boot
HI 721310	9V battery (10 pcs)
HI 731318	Tissue for wiping cuvets (4 pcs)
HI 731321	Glass cuvets (4 pcs)
HI 731325	Caps for cuvets (4 pcs)
HI 93703-50	Cuvets cleaning solution (230 mL).

CE Declaration of Conformity



HANNA instruments

CE

DECLARATION OF CONFORMITY

We

Hanna Instruments Italia Srl
viale Delle Industrie, 12/A
35010 Villafranca Padovana- PD
ITALY

herewith certify that the meter:

HI 93709

Has been tested and found to be in compliance with EMC Directive 89/336/EEC and Low Voltage Directive 73/23/EEC according to the following applicable normatives:

EN 50082-1: Electromagnetic Compatibility - Generic Immunity Standard
IEC 61000-4-2 Electrostatic Discharge
IEC 61000-4-3 RF Radiated

EN 50081-1: Electromagnetic Compatibility - Generic Emission Standard
EN 55022 Radiated, Class B

EN61010-1: Safety requirements for electrical equipment for measurement, control and laboratory us

Date of Issue: 19-02-97

D. Volpato - Engineering Manager
On behalf of
Hanna Instruments Italia S.r.l.

Recommendations for Users

Before using these products, make sure that they are entirely suitable for the environment in which they are used.

Operation of these instruments in residential area could cause unacceptable interferences to radio and TV equipments, requiring the operator to take all necessary steps to correct interferences.

Any variation introduced by the user to the supplied equipment may degrade the instruments' EMC performance.

To avoid damages or burns, do not perform any measurement in microwave ovens.

Safety Data Sheets

Read the relevant SDS sheets before performing the test.

Safety Data Sheets are available at: www.hannainst.com